IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Louis SCHOFIELD

Title: **IMMUNOGENIC COMPOSITIONS AND USES THEREOF**

Appl. No.: 09/787,111 Filing Date: 05/14/2001

Examiner: N.M. Minnifield Art Unit: 1614

RESPONSE TO ELECTION/RESTRICTIONS

Commissioner for Patents
Washington, D.C. 20231

Sir:

This paper is a response to an office action, mailed September 4, 2002, and is timely filed by virtue of the accompanying petition and payment of the applicable extension fees. The Commissioner is hereby authorized to charge any additional fees which may be required under 37 CFR §§ 1.16-1.17, as well as to credit any overpayment, to Deposit Account No. 19-0741. Should proper payment not accompany the present response, as might be the case, for example, if a check were missing or in improper or informal form, then the Commissioner likewise is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

Restriction Requirement

Examiner Minnifield has imposed a seven-way restriction requirement, contending that the enumerated "groups of inventions...are not linked as to form a single general inventive concept under PCT Rule 13.1" (office action, page 2). In particular, the examiner contends that "Group I is the main invention...and it lacks novelty" over Richardson *et al.* (1993), whereby "the other claims are not...linked by a special technical feature within the meaning of PCT Rule 13.2 so as to form a single inventive concept" (*id.*, page 3).

Applicant provisionally elects the Group III claims, 38 and 39, but traverse on the grounds that Group I does not lack novelty in view of Richardson *et al.*

More specifically, Applicant would point out that Richard *et al.* teach the induction of an immune response against a ***protein***, BM86, as distinguished from the GPI membrane anchors, which, quite incidentally, are attached to the protein due to the

bacculovirus expression system used to express BM86.*

Thus, it was neither an objective nor an outcome of the Richardson teachings that antibody was generated against the GPI molecule. Moreover, the GPI molecules which are anchored to the BM86 protein comprise, as a consequence of bacculovirus expression, *both* the glycan domain *and* the lipidic domain, which hardly comports with the recitation in claim 1 of a "molecule [that] is substantially incapable of inducing an immune response directed to a lipidic domain of GPI."

To the contrary, the present specification points out, at page 12, that animals generate antibody against the lipidic domain when immunized with free, intact GPI, *i.e,* GPI comprised of both the glycan and the lipidic domains, as would occur in a recombinantly expressed protein such as BM86. By the same token, an immune response raised against the GPI membrane molecule of BM86, rather than to the protein to which BM86 is anchored, in all likelihood would be directed to the lipidic domain and would result in the generation of IgM molecules.

In the context of malarial GPI, to which Richardson *et al.* says nothing, such IgM antibodies induced against the lipidic domain cross-react with host GPI molecule lipidic domains, resulting in the exacerbation of disease severity. The present inventors have determined, however, that immunization with a GPI comprising only the glycan domain (*i.e.*, a GPI stripped of its lipidic domain) generates antibodies against the glycan domain. Further, these antibodies are of the IgG isotype and have been found, surprisingly, to *protect* against pathology induced by subsequent malaria challenge. Accordingly, the antibodies generated to the lipidic domain of an intact GPI molecule differ in their effect to antibodies that are generated to the glycan domain of the GPI, in the context of malaria infection.

It is apparent, therefore, that applicant's claim 1 is neither anticipated nor rendered obvious by Richardson *et al.*, who, as noted, teach the generation of an immune response to a *protein molecule*, which incidentally comprises *whole* GPI membrane anchors, against which an immune response is *not* generated. Further, there is no disclosure, in relation to GPI of any microorganism, that implicates the beneficial

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* Indeed, inducing an immune response against the *protein* molecules is the means by which protection is provided to cattle against the tick that expresses BM86 in its gut. That is, cattle are immunized with BM86 and upon ingestion of blood from an immunized cow by a tick, the tick is killed due to the coupling of anti-BM86 protein antibodies from the blood of the vaccinated cow with the BM86 protein which is present in the gut of the tick.

effects achieved, pursuant to the claimed invention, by the generation of antibodies against the glycan domain of GPI, as sharply distinguished from the exacerbation of disease severity that is associated with antibodies generated against the lipidic GPI domain.

Because the Group I claims are not anticipated by Richardson *et al.*, the examiner's stated rationale for restriction does not pertain, warranting a withdrawal of the restriction requirement. Applicant requests such withdrawal, therefore, and particularly notes that restriction between Groups I and III is improper. Clearly, the same general inventive concept of using a molecule capable of inducing an immune response directed to a micro-organism GPI inositolglycan domain" but not "to a lipidic domain of a GPI"(claim 39) informs a vaccine containing such a molecule, per Group III, and immune response-inducing methodology that employs the same sort of molecule.

Species Election

Because applicant has elected Group III claims 38 and 39, albeit provisionally, the examiner's comments regarding "species...deemed to lack unity of invention" (page 3), do not pertain. Should Examiner Minnifield modify the above-discussed restriction requirement in a manner that brings into play either (a) claims 9, 21, 31 and 38 or (b) claims 10, 22, 32 and 49, then she is invited to contact the undersigned for an identification of an appropriate species and the claims to be examined that read on it.

Respectfully submitted,

Date March 4, 2003

By _____

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